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SCIENTIFIC AFFAIRS

No. 568

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TRANSLATIONS ON EASTERN EUROPE

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CONTENTS PAGE

RESULTS OF X-RAY EXAMINATIONS OF MINERS IN KUKES, PUKE DISTRICTS

Tirana SHENDETESIA POPULLORE in Albanian No 2, Apr-May-Jun 77 pp 37-41

[Article by Dr Albert Sotiri, Dr Jul Bushati, Dr Agron Lencka, Dr Maksim Cikuli and Dr Hile Tusha]

[Text] All that the party does is closely connected with the interests of the broad working masses, in order to create real possibilities for them to live as well as possible and to continually enjoy full health. The party has always placed prophylaxis in the foreground and made it the basis of its policy in the field of the protection of the people's health, as the principal means of preventing and eliminating disease. The prophylactic orientation of our health service is essentially a socialist one, since only under socialism can important state and social measures be taken.

At the 11th plenum it was emphasized that: "the study of the causes of occupational diseases must be in the center of the health workers' attention. Scientific research in this direction must be directed toward the mines and the enterprises having to do with chemical products in order to put a stop to the spread of pneumoconiosis."

Proceeding from these points, the Institute for Combating Tuberculosis has organized fluorographic detection in the mining industry workers of the Kukes and Puke districts. The detection has been done with the ZAR32 fluorograph with forms 70 x 70 mm, which according to the instructions also serves for the mainly prophylactic examination of silicosis.

The technical data on the apparatus are: Maximum power 200 milliamperes--95 kw; bulb with rotating anode of the Rooax ROL/40/40 type, focus 2.4 x 2.4 mm, objective 1/6.4.

The fluorograms made were used to study pulmonary pathology in general, and special attention was concentrated on the radiological changes that might have a connection with the harmful effect of dusts.

Altogether, 804 fluorograms were made, 402 in the Kukes cooper smelter, 232 in the Gjegjan copper mine and 169 on the Puke mining industry workers.

Table 1 shows the force divided by areas and age groups. Predominance of ages 20 to 39 is noted.

Table 1

Area	Age												Total
	Under 20		20-29		30-39		40-49		50-59		over 60		
Kukes copper smelter		24.5%	94	23.3%	131	32.3%	104	25.8%	45	11.1%		40.9	402
Gjegjan mine	11	4.7%	78	33.4%	91	39 %	42	18 %	9	3.8%	2	0.8%	233
Puke	18	10.6	60	35.5%	37	21.9%	39	23.5%	13	7.6%	2	1.1%	169
Total	53	6.5	232	28.8	259	32.2	185	23 %	67	8.8%	8	0.9	804

Under the conditions for the mining industry workers, where in spite of the measures taken there exists the danger of injury from dusts containing silica, we concentrated on the radiological changes that might be connected with them. The prolonged action of dust may lead to the appearance of chronic bronchitis and even to the typical picture of pneumoconiosis.

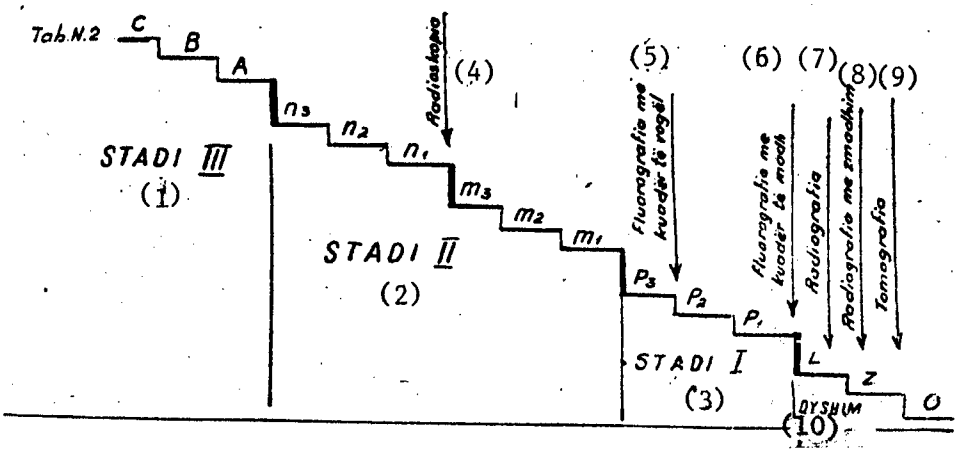
The diagnosis of pneumoconiosis, of silicosis in our case, consists in the integrated evaluation of the clinical and paraclinical anamnestic data 3, 4, 7, 11. According to all the authors, radiology is necessary to determine the diagnosis. A characteristic of silicosis is the discordance between the minimal clinical symptoms, especially those from objective examination, and the expressed radiological picture. But there may be symptoms without radiographic data. X-ray examination gains still greater importance when the clinical signs are not pathognomonic. Hence, according to the literature, it turns out that without roentgenology the diagnosis of silicosis cannot be considered certain 3, 4, 7, 11.

Fluorography also plays a role in the complex of radiological examinations, in the mainly prophylactic detection of silicosis, especially that with a large frame, 70 x 70 mm and 100 x 100 mm; the latter, according to the literature 1, 11, produces almost the same results as radiography. Table 2 gives an idea of the value of various radiological examinations in detecting silicosis, where, as is known, fluorography with a large frame is inferior to radiography.

Of underground workers, 261 fluorograms were made. Table 3 shows the fluorographed cases of underground workers, 139 in Gjergjan and 122 in Puke. The young workers and those with work records of 5-10 and 10-15 years predominate.

Twenty six fluorograms showed pictures of suspected silicosis, three being from the copper smelter workers and 23 underground workers. Seven of these cases had been diagnosed as silicosis and 1 in stage Z, suspected silicosis. The suspected cases, like the known ones, were sent for admission to the occupational disease department. After further examination of the newly

Table 2



Key:

1. Stage III
2. Stage II
3. Stage I
4. Radioscopy
5. Fluorography with a small frame
6. Fluorography with a large frame
7. Radiography
8. Radiography with magnification
9. Tomography
10. Suspected

Table 3

Area	Up to 1 year	1-3 years	3-5	5-10	10-15	15-20	over 20	Total
Kukes	26 18.7%	13 9.2%	22 15.8%	31 22.3%	26 18.7%	18 129%	3 2.1%	139
Puke	21 17.2%	27 22.1%	18 14.7%	33 27 %	18 14.7%	4 3.7%	1 08%	122
Total	47 18 %	40 15.3%	40 15.3%	64 24.8%	44 16.8%	22 8.4%	4 1.5	261

discovered cases, 6 were found to be bronchitis, 7 suspected silicosis (stage Z) and 5 cases with silicosis. It should be pointed out that the 3 cases of suspected silicosis in the fluorographs of the copper smelter workers turned out to be bronchitis.

The diagnostic discordance between the suspected cases in the fluorographs and those confirmed in the occupational disease clinic was 23 percent.

The cases of suspected silicosis (stage Z) proved to number 7, those of silicosis 5. The fluorographic picture was as follows: most often noted was the deformation of the pulmonary pattern in the form of distortions and the non-homogeneous distribution of the vasal shadows, the loss of continuity and sharpness of outlines. Almost as a rule, these changes were noted in the middle and rear areas of the lungs. Simultaneously with the deformation of the pulmonary pattern one also notes an accentuation of it, manifested by the appearance of a larger quantity of vascular tissue and accentuation of the intensity. The pattern showed a netlike form. In the initial stages it was more difficult to make out the nodulations because in the fluorograms it is still more difficult to differentiate the nodular shadows from the crossing of the vessels and because the resolving faculty is smaller.

From the data in the literature 11 on comparative studies of fluorography and radiography it has been ascertained that the nodular tissue is reflected clearly in fluorography if the dimension is not less than 2 mm. In the more advanced stages the discordance of the data between fluorography and radiography is reduced. In two cases known to be silicotic no fluorographic changes were noted that reached 9 percent discordance (with 22 silicotic cases and suspected silicosis (stage Z).

According to 11 [of the bibliography], we compared the fluorograph with a large frame with radiography and got non-concordance of the diagnosis in only 5 percent of the cases with pneumocoiniosis. The authors are of the opinion that fluorography with large frames can serve as documentary evidence in deciding the diagnosis just like ordinary radiography.

A considerable material on fluorographic examination (about 300,000 cases) and a large number of fluororoentgenographic comparisons were presented in 1956 at the Second International Congress of Fluorography (by Gernez-Rieux and Gervois). The authors noted discordant conclusions in 9 percent of the cases, as a result of the failure to make out the inconsiderable changes in the reading of the fluorograph or the mistaken interpretation of them. According to the forms, they found the following:

Table 4

Category	Z	P1	P2	P3	M1	M2	M3	N1	N2	N3	A	B	C
No of cases	8	4	1	1	1	3	--	--	1	--	1	--	--
known	1	2	--	1	1	1	--	--	1	--	1	--	--

According to the work record in stage Z, 6 cases had a record of 10-17 years, while 2 cases had 4 and 9 years of work underground. In the silicosis cases, 10 had a record of 10-25 years of work underground, while 2 had less than 10. In two cases silicosis had resulted and combined with the tubercular process in a regressive phase.

It is worth pointing out that one case of sarcoidosis in the second stage was detected from the fluorograms made. Noted in the fluorograms was an enlargement of the dexter hilar and paratracheal lumph nodules, as well as foci disseminated in the middle pulmonary fields. This was a miner with a work record of about 1 year underground. The case was confined to the Tirana sanatorium, the diagnosis was confirmed histologically, and after the treatment given a radiological regression of the pulmonary lymph-nodule changes was noted.

In conclusion, we find that fluorography also plays a role in the complex of defensive prophylactic measures applied to mine industry workers, helping in the early detection of suspected cases of silicosis.

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CURRENT TASKS OF VETERINARY SERVICE DISCUSSED

Tirana ZERI I POPULLIT in Albanian 14 Oct 77 p 2

[Article by Skender Prifti, director of the Livestock Research Institute: "The Veterinary Service Faces New Tasks"]

[Text] During the years of the people's rule, under the care and with the help of the party and the people's government the veterinary service and the veterinary science of our country has made advances and had a number of results. Some diseases of a spreading and harmful nature have disappeared. A good many others have been restricted, and efforts are being made to eradicate some of them definitively. It may be stated that in general the epizootic situation in our country is satisfactory and stabilized. Our country has never been the cause of the introduction of infections into the territories of other countries by any route whatsoever. But the achievements thus far must by no means create self-complacency, for in the work of the veterinary service and its institutions, there have been and are weaknesses and shortcomings that impede still greater results. Damage from diseases, though it has been diminishing, is still considerable. The profound transformations that have occurred in our animal husbandry demand a serious look at the work of the veterinary service on the basis of the principle of prophylaxis.

The veterinary service possesses legislation that enables it to forestall actions that endanger the health of livestock and to relieve the farms of stable diseases. But in applying the law "On the Veterinary Service," there have been and are weaknesses and shortcomings causing the outbreak of infections on this or that farm. The source of these weaknesses and shortcomings is to be sought above all in the tolerance, liberalism and opportunism of the veterinary specialists and in inadequate control by the farm sections, the Ministry of Agriculture and the Institute of Livestock Research with regard to the application of that legislation. Therefore, it is an urgent task to carry out all the measures provided by law with strict discipline and in detail.

The complexes with a high concentration of livestock, where breeding that is binding from the veterinary viewpoint is practiced have as their positive

side the fact that health measures are facilitated and the animals are under continual supervision, but it must not be forgotten that such complexes conceal the danger of the rapid spread and infection with various diseases of a large number of animals and fowl. This makes it imperative to assign an important place to new supplementary prophylactic measures in addition to the traditional veterinary measures. We stress that in such complexes the work of the veterinary specialists begins with their planning, since the mistakes that may be made in this phase -- and there have been such cases -- it is difficult to eliminate them during practice. And this is not without consequences. When a construction plan does not correspond to the veterinary requirements, a voice must be raised against it and correction of the mistakes must be insistently demanded, regardless of whether the veterinarian is or is not a part of the group of technologists.

Of special importance in these complexes are the quarantine measures and the general and specific measures of prevention. It must be admitted that in this respect too there are perceptible gaps. Above all, there is no proper understanding of the importance and role of these measures on the part of the veterinary specialists, but especially on that of the farm directors. Specific prophylaxis, that is, the application of preliminary vaccines, is a very important link in the protection of livestock from various infections, but to rely solely upon it is erroneous, since vaccines do not exist for all diseases, and not all vaccines provide one hundred percent immunity, while for a good many non-infectious diseases there is no vaccine at the present time. For all these reasons, not only should specific prophylaxis not be fetishized, but the quarantine and general prophylaxis should be correctly evaluated and applied with strict discipline.

The ways and means of transmitting infections are innumerable, but some of them present a more real danger. In general, they are known, and yet they are not appreciated. For example, on many farms the movements of people, animals and means of transportation through and across livestock properties [objekte probably = "lands and buildings"] are sometimes beyond any control. Under these conditions, not only can one not speak of a quarantine, but such a situation may be fraught with undesirable consequences.

An important role in protecting livestock from infection is played by periodic disinfection, but its practice is often a mere formality involving serious shortcomings. The time has come to mechanize this process, since the possibilities for this exist. It would not only insure the destruction of the harmful microorganisms, but would save manpower, time and disinfectant. Another fact or that must be taken into account is the gathering and treating of manure, which is a permanent source of infection and causes pollution of the environment.

There are infections such as leptospirosis that also affect people and are spread chiefly by rats. This is a wellknown fact, and yet salvation is

expected only from the vaccine instead of taking strong mechanical, chemical and biological measures to combat rats. We believe that the health service also bears responsibility in this matter, since rat extermination is an activity that belongs to it, so that it cannot stand aside.

In protecting complexes of an industrial character, special care must be devoted to veterinary-health control during the selection and shipment of animals, poultry or eggs from the supplying farms, which are fully responsible for the cleanliness of the material which they send.

The confinement of breed animals and poultry with high productivity to stables and coops, depriving them completely or partially of natural surroundings and pasturage and, at the same time, feeding them in a directed manner, creates a physiological and functional surcharge on the organism. Under these conditions, as has been verified in practice, conflicts or maladjustments appear between the needs of the organism and the parameters of the external environment, and this gives rise to disorders and non-infectious diseases of a massive character, the prevention and treatment of which are more difficult than for the infectious diseases. Experience thus far has shown that the chief causes of these diseases are irregularities in feeding, breeding, hygiene, the microclimate, and so forth, which are not only underestimated, but produce cases where, in order to evade responsibility, people persist, naturally without grounds, in attributing the damage that occurs in these cases to microbic, viral or chemical factors. Prevention of damage of this nature cannot be achieved, as some think, purely by veterinary measures. All the farm specialists and farm directors must absolutely be involved in this work, since, as Comrade Enver has said, "It is known that in order to have good, producing livestock we absolutely have to provide feed and shelter and detect and combat disease."

The massive use of chemical preparations in agriculture has brought forth new and complicated tasks for the livestock workers, since these preparations, so useful in controlling plant and fruit tree pests and raising their yields, are toxic for animals, poultry and bees and, under certain conditions, cause severe poisoning. The true causes of this poisoning lie in the non-enforcement of the very clear provisions regarding the protection, administration and use of those preparations, in the lack of coordination of action between the farm specialists and the livestock specialists, as well as in the still inadequate knowledge of the workers about those chemicals. To avoid mineral poisoning, it is necessary to raise the demand for an accounting concerning the enforcement, without any concessions, of the provisions in force regarding those preparations. The livestock workers, especially the veterinarians, must broaden their knowledge of the action on the organism of the pesticides used in our agriculture, as well as the measures that must be taken in cases of poisoning. This work must begin right in the process of training the cadres in school and continue with qualification courses. In the last two years, courses on the

subject of veterinary toxicology have been organized from time to time at the Livestock Research Institute, but the program must be further expanded. The Institute also has the duty to further deepen the work of discovering mineral and plant poisons quickly and precisely and to help in making these analyses at the bases too, in the veterinary laboratories of the districts. Likewise, the Institute should elaborate the most effective plans for giving aid to poisoned animals.

The matters presented above cannot be resolved rightly and completely by particular persons with half measures and empirical methods. As anticipated by the law "On the Veterinary Service," this service in all its work must rely on the assistance of the broad working masses.

10,002
CSO: 2102

SCIENTISTS DWELL ON THEIR WORK IN MICROBIOLOGY

Sofia RABOTNICHESKO DELO in Bulgarian 26 Nov 77 p 2

[Article by Dr Geo Neshev, senior science associate: "The New 'Professions' of Microbes"]

> [Text] The Fourth Congress of Microbiology has concluded its work. During the meetings, a representative from RABOTNICHESKO DELO, Senior Science Associate, Dr Geo Neshev spoke with prominent Bulgarian and foreign scientists concerning new and promising areas in the development of this science. We are publishing the opinions of two of these scientists.

Prof Yelena N. Kondratiyeva, head of the Microbiology Chair at Moscow State University and president of the All-Union Microbiological Society:

"Throughout the world, including in the USSR, microorganisms are the subject of research for a number of sciences including microbiology, molecular biology, genetics, biophysics and so forth. In our nation great attention is being given to the obtaining of proteins using microorganisms as well as new medicines (antibiotics); we are using microorganisms also in metallurgy.

"A new area in microbiology which was the subject of my scientific paper at the congress in Bulgaria was the seeking out of possibilities to use microorganisms in obtaining energy resources. I am studying the ability of microbes to assimilate solar energy with the aid of photosynthesis. The question is also being studied of obtaining molecular hydrogen and methane, that is, gaseous fuels which contain a great deal of energy. Certainly, this will be done by the representatives of the microworld. This, as I have said, is a very new problem on which work was started at the beginning of the 1970's. This interdisciplinary problem which has been termed the microbiological conversion of energy concerns scientists not only in the USSR but also within the entire commonwealth of CEMA nations.

"Another new area of microbiology which is being successfully developed in the USSR is so-called "space microbiology." This term must be understood in a dual manner. First of all, with the help of this science, we must study the question of whether the existence of life on other planets is possible. Here a great deal of attention is being given to the microbes, because they are primitive forms of life, and if we assume that living organisms also exist on other celestial bodies, they are representatives of the microworld. Another task is to provide cosmonauts with food with long-distance and protracted flights and at the same time the purification of the atmosphere in the spacecraft cabin. As can be seen, all of this makes our microbiology actually a science of the present and the future. Finally I would like to state that in Moscow we have many scientific microbiologists from Bulgaria. We are particularly satisfied with them."

Corresponding Member, Professor and Dr Aleksandur Toshkov, chairman of the Microbiological Section Under the Union of Scientific Workers:

"After the people's victory of 9 September, Bulgarian microbiology, in following the example of Soviet microbiology, has attained unprecedented successes. Here an important role has been played by the social principle which lies at the basis of our socialist public health. A number of prominent Soviet microbiologists have visited our nation and provided inestimable help. Many of our specialists have gone to the USSR for training in the solid Soviet scientific schools, where the most essential has been assimilated, that is, the social element or preventive focus of Soviet medicine. At present in our nation exceptional concern is being shown for the development of our science.

"One of the first major successes of socialist microbiology in Bulgaria was achieved in the area of combating contageous diseases of man and animals. Bulgarian antibiotics are a ligitimate pride of our scientists. As is known, we have developed the production of a number of new, modern antibiotics such as gentamycin, tubocin, ampicillin, cephalosporins and others. Bulgarian biological preparations such as various vaccines and serums are also of an exceptionally high level. In the area of veterinary sciences, we must emphasize the obtaining of an improved vaccine against solid-ungulate hoof-and-mouth disease, against pseudohydrophobia and particularly against Marek's disease (leukemia) in poultry. At the Institute for General and Comparative Pathology Under the Bulgarian Academy of Sciences, Prof Zakhari Mladenov and Prof Stoyko Nedyalkov have received the Dimitrov Prize for isolating three new strains of cancer viruses which cause tumors in poultry. On this basis a vaccine was developed which is being used successfully in Bulgaria and abroad.

"The main tasks of industrial microbiology in Bulgaria, as a strategic direction, were outlined at the Tenth and Eleventh BCP congresses. As a result of this, the volume of industrial product has increased by over two-fold. The enzyme preparations of protease, amylase, pectinase, and cellulase have been introduced into practice, and methods for producing plant protection compounds have been developed. The successful solution

to the food problem in the world envisages an improvement in the production of microbial proteins based upon traditional sources as well as from new raw materials (methanol, ethanol, paraffin and others). We must build capacity for producing 8,000 tons of protein from fungul mycelium annually. In the struggle to improve and restore the environment with the means of industrial microbiology, in the coming years there are plans to use industrial gases for the purpose of the biosynthesis of carbon compounds. The microbiology of food products is also well developed in our nation. In line with increasing the yield of soils, particularly urgent problems are awaiting their solution by soil microbiology. The principles of our science are also being successfully employed in the bacterial processing of poor metal ores, as well as in the struggle to preserve and restore ancient monuments of culture and art.

"All these problems were discussed creatively during the days of the congress, and of this it can be said that it provided a new impetus to the development of Bulgarian microbiology."

10272
CSO: 2202

SCIENTIFIC INSTRUMENTS FOR SPACE RESEARCH DESCRIBED

Sofia VECHERNI NOVINI in Bulgarian 5 Nov 77 p 6

[Article by Mitko Gogoshev, candidate of physical sciences: "New Bulgarian Instruments in Space -- Reportage from the Spaceport"]

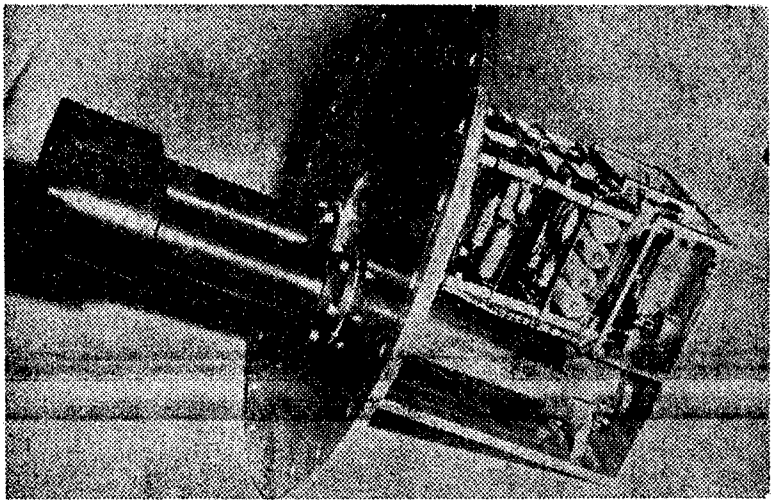
[Text] Eight decades ago when the Kaluga scientist Konstantin Tsiolkovskiy suggested the idea of interplanetary flight aboard a rocket, under the conditions of tsarist Russia this was taken as far-out and impracticable fantasy. The victory of the Great October Socialist Revolution, however, showed that realization of these bold dreams is not that remote. The first experiments with liquid-propellant rockets in the 1930's and the vigorous development of Soviet rocket technology during World War II and thereafter led to that unforgettable moment on 4 October 1957 when the first Soviet artificial earth satellite went aloft. There followed the flights of the unforgettable Gagarin and the storming of cosmic heights -- the moon, Venus, Mars.

Only ten years after the first satellite a striking manifestation of the fraternal integration of the socialist countries was the adoption of the joint "Intercosmos" program. In ten years time the results are 18 satellites in orbit, six powerful geophysical rockets, hundreds of meteorological rockets.

The Soviet scientists and the scientists of the socialist countries working in the sphere of space research marked the glorious 60th anniversary of the October Revolution in worthy fashion. On 25 October 1977 with the help of the powerful "Vertikal-6" Soviet space rocket a unique experiment was conducted: a vertical section of circumterrestrial space at a height from 60 to 1500 kilometers above the earth's surface. The scientific apparatus was made in the Soviet Union, Bulgaria, Czechoslovakia and Hungary.

For the first time two Bulgarian instruments, developed and produced at the Central Space Research Laboratory of the Bulgarian Academy of Sciences, flew in space simultaneously. One of them was an electronic device, the result of a Bulgarian-Soviet experiment in measuring the

concentration of electrons and ions and electron temperature under the designation "P-ZR." The second instrument was unique, purely Bulgarian -- the EMO-R2 electrophotometer for measuring very weak space radiations (shown in the photograph).



It is known that a large amount of the earth's upper atmosphere is in a plasma state. Short-wave solar radiation during the daytime causes ionization of a significant portion of the atoms and molecules in the circumterrestrial space. Some of them more rapidly or more slowly recombine with the electrons and reestablish neutral particles, and this is associated with the radiation of light quanta in various parts of the optical spectrum. Study of the spectral distribution of this very weak light, its variations at different times over a 24-hour period and its connection with various other processes in the plasma and solar processes is a very important scientific problem in space physics.

The Bulgarian instrument was created for experimental investigation of two important light lines in the red portion of the spectrum. But measurement was complicated to a significant extent by the fact that the experiment was conducted in the daytime under the rays of the glaring sun. The intensity of solar radiation in this spectral region is about a trillion times as great as the measured intensity. This created tremendous difficulties. But they were successfully overcome by resourcefully conceived optical blinds mounted in front of two small telescopes. The blinds were developed and produced on the principle of the so-called black mirror. They let through only that light which comes from in front. Lateral solar light is absorbed or reflected.

Inside the instrument two narrow interference filters placed behind the lenses separated out only the two red lines. By means of supersensitive photodetectors these are converted into electric current which further on was amplified and after additional transformation transmitted to earth.

On 25 October 1977 a few hours before blast-off the weather played a bad joke on us. Thick black clouds appeared and light rain began to fall. The day before we were at the blast-off where the last preparatory operations on the powerful 25-meter "Vertikal-6" rocket were made. The weather was excellent. The warm rays of the sun, as it were, caressed the shining red fairing that concealed the container of scientific apparatus underneath. But the bad weather did not hinder the experiment.

The time is finally 1500 hours. Blast-off! Enormous tongues of fire flare from the four rocket engines. An awesome roar resounds. The imposing rocket, as it were, hung suspended for an instant in the air and then zoomed upwards at high speed. In exactly 2 minutes and 8 seconds at a height of 173 kilometers the container with the scientific apparatus looked about and zoomed upwards at a rate of 5 kilometers per second. In a minute and a half it reached a height of 1502 kilometers. From its zenith it aimed its red tubes at limitless space, and the Bulgarian photometer operated perfectly. All the other instruments operated impeccably too.

A vast amount of information was obtained which was processed in a moment. During these minutes we cordially thanked the Soviet specialist scientists and the rocketeers who carried out the experiment with high-precision accuracy.

We wished them in advance a happy holiday which we, albeit at a distance, shall celebrate jointly.

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NEW BUILDING MATERIALS DESCRIBED

Sofia TEKHNICHESKO DELO in Bulgarian 8 Oct 77 p 5

[Article by Senior Science Associate, Engineer M. Kolev: "The Future of Building Materials: A Specialist's View"]

[Text] The variety and high quality of the materials used in insulation, facing and finishing work will make it possible to shorten construction deadlines.

The requirement is not just new, but also efficient materials.

The century in which we live is characterized by the vigorous development of all types of construction, the rapid growth of the mass production of construction materials, and the flourishing of new techniques for the production of materials, elements and hardware for new construction. The lack of a developed construction-materials industry, however, has been a significant impediment to the solution of basic demographic and social problems.

Up until 1980 and even later on, the principal initial materials for construction will continue to be cement, lime, gypsum, steel, light and heavy additives, ceramics. From these materials, all building structures, appurtenances and products, especially the supporting structure, will be made. By way of supplement for various purposes, there will be increasingly large-scale use of plastics, light alloys, glass and other products of industry which are used for finishing work.

Technical progress in the application of basic materials will also be shown in their derivatives (concrete, ferroconcrete etc.), and for cement the need for a sharp rise in its activity is emerging. The current average activity of 450 kg/sq cm must be raised to about 600 kg/sq cm.

Steel will find greater and greater application not only by itself, but also in combinations with concrete, plastics and other materials. Progress here

will be manifested in an increase in mechanical strength and corrosion resistance and in the production of structural shapes which will permit the qualities of steel to be more fully utilized. It is known that steel costs rise much more slowly than steel strength characteristics. This in itself shows the economic advantages of using higher-strength steel.

Heavy additives will not change their properties for obvious reasons. The main thing in their development remains highly mechanized production, grading, and purification. In the case of concretes used on a mass scale, probably no changeover to many fractions should be made, but to small-grain concrete in order to simplify and standardize the technology of making the concrete mixture and for the purpose of working easily with them. Light additives (Keramzit, schistoporite, perlite, agloporite etc.) will have to expand and develop their application. Although the Construction-Materials Institute has already built a Keramzit sand installation, it has not yet been brought on stream due to organizational and technical reasons.

For concretes the lines of development are as follows: Use of high-activity brands (300-400 kg/sq cm); increase in the number of light concretes; larger-scale use of additives in view of durability requirements; regulation of bonding and hardening processes; improvement of concrete technology etc.

Thus far the employment of cellular concretes is still very limited and they have not taken their proper place in the total picture of construction materials and finished products for high construction. The trend in the development of these concretes in our country is to develop production of unreenforced and reenforced items for residential, industrial, cultural and domestic, and agricultural construction in regions suitable for the purpose.

Regarding all other materials, which are very diverse and with which insulation, facing and finishing work in construction is done, it can be said that from the example of the advanced countries sufficient production must be assured. The external and internal appearance of buildings is shaped to a great extent by these materials. Their diversity and high quality will make possible a decisive stride towards mechanized and industrial execution and a shortening of construction deadlines. We know that at present the lack of such materials is of fundamental importance for our construction. We have not built sufficient capacity for perlite products. World and Soviet experience are not put to use.

Construction materials are new when they differ in their physicomechanical and physicochemical properties from materials hitherto existing and employed in practice. It is logical that noa all new materials are efficient. Those of the new materials are efficient which meet the following

conditions: improvement in their own qualities that involve exclusively their purpose in buildings and appurtenances (strength, watertightness, insulating capacity, durability, hygienic quality, esthetics etc.); reduction of labor inputs not only during their production, but also during their processing until a construction element ready for use is obtained, i.e., stimulation of the use of machine technology in construction and an increase in labor productivity; replacement of expensive and scarce materials and, subject to observance of the above conditions, rational and expedient use of local raw materials and industrial wastes or surpluses; contribution to an improvement of construction quality and a reduction of construction cost.

For more rapid adoption of the achievements of science and technology in the construction-materials industry, scientific research must be done on the production of new materials, enterprises must be built, and existing capacity must be redesigned and modernized, drawing first and foremost on Soviet experience.

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TITANIUM SOLUTION INCREASES PROTEIN CONTENT, YIELDS OF LUCERNE

Budapest MAGYAR NEZOGAZDASAG in Hungarian No 47, 23 Nov 77 p 11

[Article by Dr Istvan Pais, department head, professor, University of Horticulture, Budapest: "Increase of Alfalfa's Yield and Protein Content Under the Effect of Sprinkle Fertilization With Titanium Solution*"]

[Text] Those spray fertilizers which, besides the macrocomponents, also contain various microelements, are becoming increasingly more popular in agricultural practice.

Titanium as New Microelement

Research has been going on for nearly a decade at the Chemistry Department of the Horticulture University in connection with the botanical effects of titanium. Earlier, titanium was not among those microelements which are considered important for vegetation. The presence of very small amounts of titanium can be shown in some plants, but its possible biological role--like those of several other elements--is not clear even today.

In light of our results achieved in the last few years, we consider it unambiguously proven that titanium exerts a favorable effect on the growth yield of several plant types, and on the internal content values of the crop.

Since these days, further opportunities of greater protein production are sought all over the world, it was a natural idea to try out the effect of titanium spray fertilization on alfalfa, which is among the fodder types providing the most protein.

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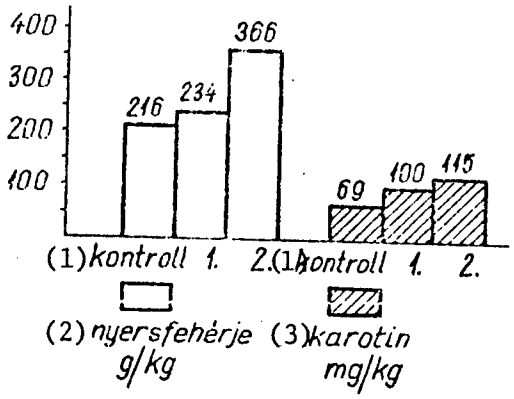
* Besides several co-workers of the chemistry department, co-workers of the university's agriculture department also participated in the research described in the article.

Development of Raw Protein and Carotin Content in Samples of the First Cutting (Soroksar, 1977)



Key:

1. Control
2. Raw protein, grams per kilogram
3. Carotin, milligrams per kilogram

Conducting the Experiments

In 1976 and 1977, we conducted small and large parcel experiments in several state farms, producing cooperatives and at the university's experimental farm in Soroksar. Even the results of the first year already show the positive affect of spray fertilization, and the second year showed provable significance, evaluated by mathematical-statistical methods in favor of the treatment. In the [state] farms, the spraying was done on large, 5 hectare parcels by airplane, the small parcel experiments were sprayed with a manual sprayer, repeated six times, on $15m^2$ areas arranged in a split plot system. The small parcel experiments in Soroksar were based on the experimental farm's Nagyszenasi-type alfalfa, planted in 1975. The type of ground was sand, found between the Danube and the Tisza. On the areas designated to investigate the effect of foliage fertilization, the plant food material supply was in accordance with the farm's average.

The spray contains the titanium in the form of a water-soluble chelate-complex in very low concentration. It can be mixed with any plant protection chemical or with other foliage fertilizer, and thus its application represents no separate expense. Two sprayings are recommended before the cuttings, at 7-10 day intervals, but even one spraying has a favorable effect.

Experimental Results

We used the spray material in 1 liter per hectare and 5 liters per hectare amounts--appropriately diluted with water for the method of application.

The two treatments are designated in the tabulations with 1 and 2. According to measured data of the Mezohegyes State Farm, the foliage fertilizer used at the lower concentration resulted in 9.3 percent hay production increase, and in the higher concentration, 2.1 percent; at the Kalocsa State Farm, 24 percent more hay was produced on the treated area.

Evaluation of the Experimental Results

Spray fertilizer containing titanium microelement can be used successfully to increase the production yield and the internal content values of alfalfa. Growth of vegetation is faster, greener and leaf area is larger on the sprayed area. Thus, with the parallel growth of hay production and protein content, 10-20 percent more protein may be obtained from a 1-hectare unit area. In establishing feed value, the carotin-content which has significance, shows appreciable growth mainly in samples of the first two cuttings, compared to the samples which did not receive treatment.

Table 1. Green Production of Foliage-Fertilized Alfalfa per Cutting, and Total (Soroksar, 1977)

(A) Kaszálások és kezelés	(B) Zöldtermés (C) kg/parcella	(D) q/hektár	%
(E) *I. kaszálás*			
(F) kontroll	23,66	157,77	100,0
(G) kezelt 1.	24,81	165,44	104,8
(G) kezelt 2.	25,65	171,00	108,3
(K) $SzD_{5\%}$ = 1.248			
(E) *II. kaszálás*			
(F) kontroll	15,62	104,16	100,0
(G) kezelt 1.	16,36	109,08	104,7
(G) kezelt 2.	16,67	111,14	106,7
(K) $SzD_{5\%}$ = 0,388			
(E) *III. kaszálás*			
(F) kontroll	17,60	117,33	100,0
(G) kezelt 1.	18,56	123,77	105,4
(G) kezelt 2.	18,15	121,05	103,1
(K) $SzD_{5\%}$ = 0,635			
(H) összesen:	✓	✓	✓
(F) kontroll	56,25	375,05	100,0
(G) kezelt 1.	59,70	398,00	106,1
(G) kezelt 2.	60,48	403,20	107,5
(K) $SzD_{5\%}$ = 1,306			

Key:
(A) Cuttings and treatment
(B) Green production
(C) Kg per parcel
(D) Quintals (100 kg) per hectare
(E) Cutting [numbered]
(F) Control
(G) Treated
(H) Total
(K) S_ZD [expansion unknown]

Table 2. Protein Content of Foliage-Fertilized Alfalfa Samples

(A) A minta adatai		(B) Nyers-fehérje a légszáraz anyagban g/kg	%
(C) Soroksár	1976		
	kontroll (D)	254,5	100,0
	kezelt 1. (E)	268,4	105,4
Soroksár	1977		
	kontroll (D)	205,0	100,0
	kezelt 1. (E)	227,0	110,7
	kezelt 2. (E)	249,6	121,7
Mezőhegyes	1976		
	kontroll (D)	135,9	100,0
	kezelt 1. (E)	155,7	114,6
Mezőhegyes	1977		
	kontroll (D)	216,0	100,0
	kezelt 1. (E)	221,0	102,3
	kezelt 2. (E)	231,0	106,9
Orosháza	1976		
	kontroll (D)	222,5	100,0
	kezelt 1. (E)	255,3	114,7

Key:

(A) Data of the samples
(B) Raw protein content in the air dried material, g/kg
(C) Names of locations of tests (cities)
(D) Control
(E) Treated

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END